QUIZZES

Practice test 1 Unit 6

10 Questions

7 min

Topics

Coulomb's Law(Coulomb's law in material media), Electric field and its intensity

Start Quiz

06 : 57

Q 1/10 7 min Hint

Q : Coulomb's force is represented by

A $F = \frac{kq_1q_2}{r^{-2}}$

B $F = 4\pi\varepsilon_o \frac{q_1q_2}{r^2}$

C $F = \frac{1}{4\pi\varepsilon_o} \frac{q_1q_2}{r^2}$

D $F = \frac{1}{4\pi\varepsilon_o} \frac{q_1q_2}{r}$

06 : 55

Q 2/10 7 min Hint

Q : The electric field intensity at infinite distance from point charge is

A infinite

B zero

C positive

D negative

06 : 53

Q 3/10 7 min Hint

Q : The direction of electric field Intensity is

A along the direction of charge

B perpendicular to the direction of force

C along the direction of force

D none of these

06 : 50

Q 4/10 7 min Hint

Q : Static charges creates

A electric field

B magnetic field

C both a and b

D gravitational field

06 : 48

Q 5/10 7 min Hint

Q : In central region of a parallel plate capacitor the electric field lines are

A perpendicular

B parallel

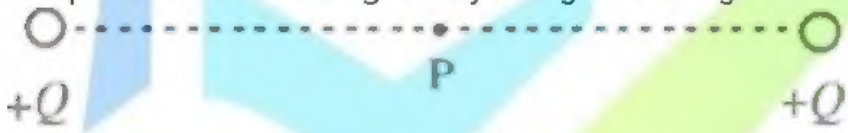
C orthogonal

D curved

06 : 44

Q 6/10 7 min Hint

Q : The figure below shows two point charges, $+Q$ and $+Q$. If the right-hand charge were absent, the electric field at Point P due to $+Q$ would have a strength of E. With the right-hand charge in place, what is the strength of the total electric field at P, which lies at the midpoint of the line segment joining the charges?



A 0

B $\frac{E}{4}$

C $\frac{E}{2}$

D 2E

06 : 42

Q 7/10 7 min Hint

Q : A charge q_1 exerts some force on a second charge q_2. If third charge q_3 is brought near, the force of q_1 exerted on q_2:

A increases

B zero

C decreases

D remains unchanged

06 : 39

Q 8/10 7 min Hint

Q : What would happen to the electrostatic force between a pair of charged particles if both charges were doubled and the distance between them were also doubled?

A It would decrease by a factor of 4

B It would decrease by a factor of 2

C It would remain unchanged

D It would increase by a factor of 2.

06 : 36

Q 9/10 7 min Hint

Q :

When a glass rod is rubbed with silk, it

A Gains electrons from silk

B Gives electrons to silk

C Gains protons from silk

D Gives protons to silk

Q :

Dielectric constant for metal is

- zero
- infinite
- 1
- greater than 1

QUIZ RESULT

Practice test 1 Unit 6

0/10

0%

Incorrect

1/10

Q : Coulomb's force is represented by

$F = \frac{kq_1q_2}{r^{-2}}$

$F = 4\pi\varepsilon_0 \frac{q_1q_2}{r^2}$

$F = \frac{1}{4\pi\varepsilon_0} \frac{q_1q_2}{r^2}$

$F = \frac{1}{4\pi\varepsilon_0} \frac{q_1q_2}{r}$

Explanation

Basic information

2/10

Q : The electric field intensity at nfinite distance from point charge is

infinite

zero

positive

negative

Explanation

$$E = \frac{Kq_1}{r^2} = \frac{Kq_2}{\infty} = 0$$

Incorrect

3/10

Q : The direction of electric field Intensity is

along the direction of charge

perpendicular to the direction of force

along the direction of force

none of these

Explanation

Book line

incorrect

4/10

Q : Static charges creates

electric field

magnetic field

both a and b

gravitational field

Explanation

Basic information

Incorrect

5/10

Q : In central region of a parallel plate capacitor the electric field lines are

perpendicular

parallel

orthogonal

curved

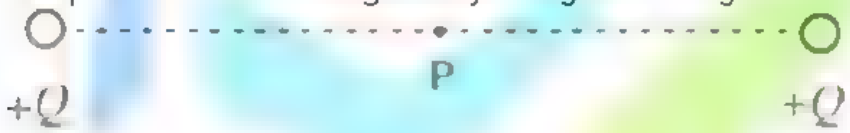
Explanation

Basic concept

Incorrect

6/10

Q : The figure below shows two point charges, $+Q$ and $+Q$. If the right-hand charge were absent, the electric field at Point P due to $+Q$ would have a strength of E. With the right-hand charge in place, what is the strength of the total electric field at P, which lies at the midpoint of the line segment joining the charges?



0

$\frac{E}{4}$

$\frac{E}{2}$

2E

Explanation

There is no field between the two similar charges at centre

Correct | Unattempted

Incorrect | 7/10

Q : A charge q_1 exerts some force on a second charge q_2. If third charge q_3 is brought near, the force of q_1 exerted on q_2:

- increases
- zero
- decreases
- remains unchanged

Explanation

The force will still remain $\frac{q_1 q_2}{4\pi\epsilon_0 r^2}$

Correct | Unattempted

Incorrect | 8/10

Q : What would happen to the electrostatic force between a pair of charged particles if both charges were doubled and the distance between them were also doubled?

It would decrease by a factor of 4

It would decrease by a factor of 2

It would remain unchanged

It would increase by a factor of 2.

Explanation

Applying Coulomb's law we see that the electric force will not change.

$$F' = k\frac{Qq}{r'^2} = k\frac{2Q \cdot 2q}{(2r)^2} = k\frac{4Qq}{4r^2} = k\frac{Qq}{r^2} =$$

Incorrect 9/10

Q :

When a glass rod is rubbed with silk, it

- Gains electrons from silk
- Gives electrons to silk
- Gains protons from silk
- Gives protons to silk

Explanation

On rubbing glass rod with silk, excess electron transferred from glass to silk. So glass rod becomes positive and silk becomes negative.

4 5 6 7 8 9 10

Incorrect

10/10

Q :

Dielectric constant for metal is

zero

infinite

1

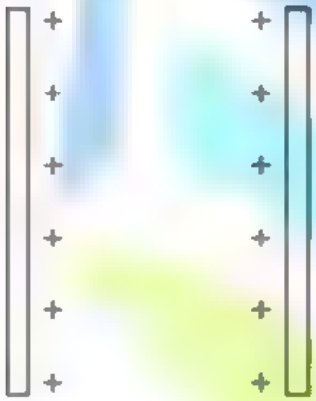
greater than 1

Explanation

Dielectric constant
$\kappa=\varepsilon/\varepsilon_0$

Permittivity of metals (ε) is assumed to be very high.

Q :
The value of electric intensity between two similarly charged parallel plates as shown in the figure according to Gauss's law is



(1) $+\frac{\sigma}{\varepsilon_o}$

(2) $-\frac{\sigma}{\varepsilon_o}$

(3) $\pm\frac{\sigma}{\varepsilon_o}$

(4) 0

Q : Two thin infinite parallel plates have uniform charge densities σ and σ. The electric field in the space between them is

- $\frac{\sigma}{2\varepsilon_o}$
- $\frac{\sigma}{\varepsilon_o}$
- $\frac{\sigma}{60}$
- zero

Q : The electric field intensity with in a hollow charged conductor is

- zero
- infinite
- maximum
- none of these

Q : A rubber balloon is given a positive charge such that at its surface potential is +5V. What will be the value of potential and electric field strength at the centre of rubber balloon

V	E
−5V	5 NC^{-1}
+5V	5 NC^{-1}
+5V	0 NC^{-1}
−5V	0 NC^{-1}

−5V, 5 NC^{-1}

+5V, 5 NC^{-1}

+5V, 0 NC^{-1}

−5V, 0 NC^{-1}

Q : Gaussian surface is

- imaginary surface
- an open surface
- curved surface
- plane surface

Q : The electric intensity due to two oppositely charged plates is _____ times due to a single plate.

- $\frac{1}{2}$
- $\frac{1}{4}$
- 2
- 3

Q : 1 micro-farad =

- 10^{6} F
- 10^{-12} F
- 10^{-9} F
- 10^{15} F

Q : The electric field between the oppositely charged plates of surface charge density σ is σ/ε_0. If one of the plates is removed then electric field becomes

- Zero
- $2\sigma/\varepsilon_0$
- $\sigma/2\varepsilon_0$
- $\sigma/4\varepsilon_0$

Q :

Change Q on a capac tor varies with voltage V as shown in the figure, where Q is taken along the X-axis and V along the Y-axis. The area of triangle OAB represents

A. Capacitance

B. Capacitive reactance

C. Magnetic field between the plates

D. Energy stored in the capacitor

Q :

The capacity of parallel plate capacitor depends on

a. The type of metal used

b. The thickness of plates

c. The potential applied across the plates

d. The separation between the plates

QUIZ RESULT

Practice test 2 Unit 6

0/10

0%

The value of electric intensity between two similarly charged parallel plates as shown in the figure according to Gauss's law is

(A) $+\frac{\sigma}{\varepsilon_o}$

(B) $-\frac{\sigma}{\varepsilon_o}$

(C) $\pm\frac{\sigma}{\varepsilon_o}$

(D) 0

Explanation

Flux between similarly charged plates

$\phi = 0$

$EA\cos\theta = 0 \because E = 0, A \neq 0$

Incorrect

2/10

Q : Two thin infinite parallel plates have uniform charge densities σ and σ. The electric field in the space between them is

A $\frac{\sigma}{2\varepsilon_o}$

B $\frac{\sigma}{\varepsilon_o}$

C $\frac{\sigma}{60}$

D zero

Explanation

Text book information

Incorrect

3/10

Q : The electric field intensity with in a hollow charged conductor is

zero

infinite

maximum

none of these

Explanation

$$\vec{E}.\vec{A} = \frac{\theta}{\varepsilon_0} = \frac{0}{\varepsilon_0}$$

$$\vec{E}.\vec{A} = 0 \qquad \vec{E} = 0,\ \vec{A} \neq 0$$

Correct

Unattempted

Incorrect

4/10

Q : A rubber balloon is given a positive charge such that at its surface potential is +5V. What will be the value of potential and electric field strength at the centre of rubber balloon

V	E
−5V	5 NC^{-1}
+5V	5 NC^{-1}
+5V	0 NC^{-1}
−5V	0 NC^{-1}

−5V, 5 NC^{-1}

+5V, 5 NC^{-1}

+5V, 0 NC^{-1}

−5V, 0 NC^{-1}

Explanation

Q : A rubber balloon is given a positive charge such that at its surface potential is +5V. What will be the value of potential and electric field strength at the centre of rubber balloon

V	E
−5V	5 NC^{-1}
+5V	5 NC^{-1}
+5V	0 NC^{-1}
−5V	0 NC^{-1}

A −5V, 5 NC^{-1}

B +5V, 5 NC^{-1}

C +5V, 0 NC^{-1}

D −5V, 0 NC^{-1}

Explanation

- $V_{inside} = V_{surface} = constant$
- $E = 0 (q_{inside} = 0)$

Q : Gaussian surface is

- imaginary surface
- an open surface
- curved surface
- plane surface

Explanation

Gaussian surface is an imaginary closed surface

Correct

Incorrect

Incorrect

10

Q : The electric intensity due to two oppositely charged plates is _____ times due to a single plate.

$\frac{1}{2}$

$\frac{1}{4}$

2

3

Explanation

For single charged plate $E_s = \frac{\sigma}{2\varepsilon_o}$

For two opposite plates $E = \frac{\sigma}{\varepsilon_o}$

It is clear that $\boxed{E_{\text{fortwooppositeplates}} = 2 \times E_{\text{single}}}$

Incorrect

7/10

Q : 1 micro farad =

- 10^{-6} F
- 10^{-12} F
- 10^{-9} F
- 10^{-15} F

Explanation

$1\mu F = 10^{-6}$ F

Incorrect

8/10

Q : The electric field between the oppositely charged plates of surface charge density σ is σ/ε_0. If one of the plates is removed then electric field becomes

Zero

$2\sigma/\varepsilon_0$

$\sigma/2\varepsilon_0$

$\sigma/4\varepsilon_0$

Explanation

2nd Application of Gauss's law

Correct | Unattempted

Incorrect | 9/10

Q :

Change Q on a capac tor varies with voltage V as shown in the figure, where Q is taken along the X-axis and V along the Y-axis. The area of triangle OAB represents

A Capacitance

B Capacitive reactance

C Magnetic field between the plates

D Energy stored in the capacitor

Explanation

U=1/2QV= Area of triangle OAB

Correct

Unattempted

Incorrect

10/10

Q :

The capacity of parallel plate capacitor depends on

The type of metal used

The thickness of plates

The potential applied across the plates

The separation between the plates

Explanation

$C = \frac{K\varepsilon_0 A}{d}$

4 5 6 7 8 9 10

Q :

The energy of a charged capacitor is given by the expression (q = charge on the conductor and C = its capacity)

- $q^2/2C$
- q^2/C
- $2qC$
- $q/2C^2$

Q :

The capacity of a condenser is 4×10^{-6} farad and its potential is 100 volts . The energy released on discharging it fully will be

- 0.02 Joule
- 0.04Joule
- 0.025Joule
- 0 05Joule

Q :

A parallel plate condenser has a capacitance 50μF in air and 110μF when immersed in an oil. The dielectric constant 'k' of the oil is

- 0.45
- 0.55
- 1.10
- 2.20

Q :

The capacity of a parallel plate condenser is C Its capacity when the separation between the plates is halved will be

- 4C
- 2C
- C/2
- C/4

Q :

A parallel plate capacitor is immersed in an oil of dielectric constant 2. The field between the plates is

- Increased proportional to 2
- Decreased proportional to 1/2
- Increased proportional to √2
- Decreased proportional to 1/√2

Q :

A capacitor of capacity C has charge Q and stored energy is W . If the charge is increased to 2Q , the stored energy will be

- 2W
- W/2
- 4W
- W/4

Q :

The capacity and the energy stored in a parallel plate condenser with air between its plates are respectively C_o and W_o . If the air is replaced by glass (dielectric constant = 5) between the plates, the capacity of the plates and the energy stored in it will respectively be

- $5C_o, 5W_o$
- $5C_o, W_0/5$
- $C_o/5, 5W_o$
- $C_o/5, W_o/5$

Q :

One plate of parallel plate capacitor is smaller than other, then charge on smaller plate will be

A. Less than other

B. More than other

C. Equal to other

D. Will depend upon the medium between them

Q :

The intensity of electric field at a point between the plates of a charged capacitor

A. Is directly proportional to the distance between the plates

B. Is inversely proportional to the distance between the plates

C. Is inversely proportional to the square of the distance between the plates

D. Does not depend upon the distance between the plates

Q :

When a lamp is connected in series with capacitor, then

- Lamp wil not glow
- Lamp will burst out
- Lamp will glow normally
- None of these

QUIZ RESULT

Practice test 3 Unit 6

0/10

0%

Q ·

The energy of a charged capacitor is given by the expression (q = charge on the conductor and C = its capacity)

- $q^2/2C$
- q^2/C
- 2qC
- $q/2C^2$

Explanation

q=CV
and
$U=12/CV^2=q^2/2C$

Incorrect

2/10

Q :

The capacity of a condenser is 4×10^{-6} farad and its potential is 100 volts . The energy released on discharging it fully will be

- 0.02 Joule
- 0 04Joule
- 0.025Joule
- 0.05Joule

Explanation

$J=1/2CV^2=12\times4\times10^{-6}\times(100)^2=0.02J$

←

Incorrect

3/10

Q :

A parallel plate condenser has a capacitance 50μF in air and 110μF when immersed in an oil. The dielectric constant 'k' of the oil is

0.45

0.55

1.10

2.20

Explanation

$$C_{medium} = K C_{air} \Rightarrow K = \frac{C_{medium}}{C_{air}} =$$

Incorrect

4/10

Q :

The capacity of a parallel plate condenser is C . Its capacity when the separation between the plates is halved will be

4C

2C

C/2

C/4

Explanation

$$C = \frac{\varepsilon_0 A}{d}, C' = \frac{\varepsilon_0 A}{d/2} = 8r^3 = R^3$$

Correct

Unattempted

Incorrect

5/10

Q :

A parallel plate capacitor is immersed in an oil of dielectric constant 2. The field between the plates is

Increased proportional to 2

Decreased proportional to 1/2

Increased proportional to √2

Decreased proportional to 1/√2

Explanation

$$E_{medium} = \frac{E_{air}}{K} = \frac{E}{2}$$

Incorrect

6/10

Q :

A capacitor of capacity C has charge Q and stored energy is W . If the charge is increased to 2Q , the stored energy will be

2W

W/2

4W

W/4

Explanation

$W=Q^2/2C$

$W'=4W$

Q :

The capacity and the energy stored in a parallel plate condenser with air between its plates are respectively C_o and W_o . If the air is replaced by glass (dielectric constant = 5) between the plates, the capacity of the plates and the energy stored in it will respectively be

- $5C_o$, $5W_o$
- $5C_o$, $W_0/5$
- $C_o/5$, $5W_o$
- $C_o/5$,$W_o/5$

Explanation

When a dielectric K is introduced in a parallel plate capacitor its capacity becomes K times. Hence

$$C' = 5C_0 \quad \text{Energy stored } W_0 = \frac{q^2}{2C_0}$$

Incorrect

8/10

Q :

One plate of parallel plate capacitor is smaller than other, then charge on smaller plate will be

Less than other

More than other

Equal to other

Will depend upon the medium between them

Explanation

Because the charges are produced due to induction and moreover the net charge of the condenser should be zero.

Correct

Unattempted

Incorrect

9/10

Q :

The intensity of electric field at a point between the plates of a charged capacitor

Is directly proportional to the distance between the plates

Is inversely proportional to the distance between the plates

Is inversely proportional to the square of the distance between the plates

Does not depend upon the distance between the plates

Explanation

Electric field between the plates of parallel plate capacitor is uniform and it doesn't depend upon distance.

Incorrect

10/10

Q :

When a lamp is connected in series with capacitor, then

A. Lamp wil not glow

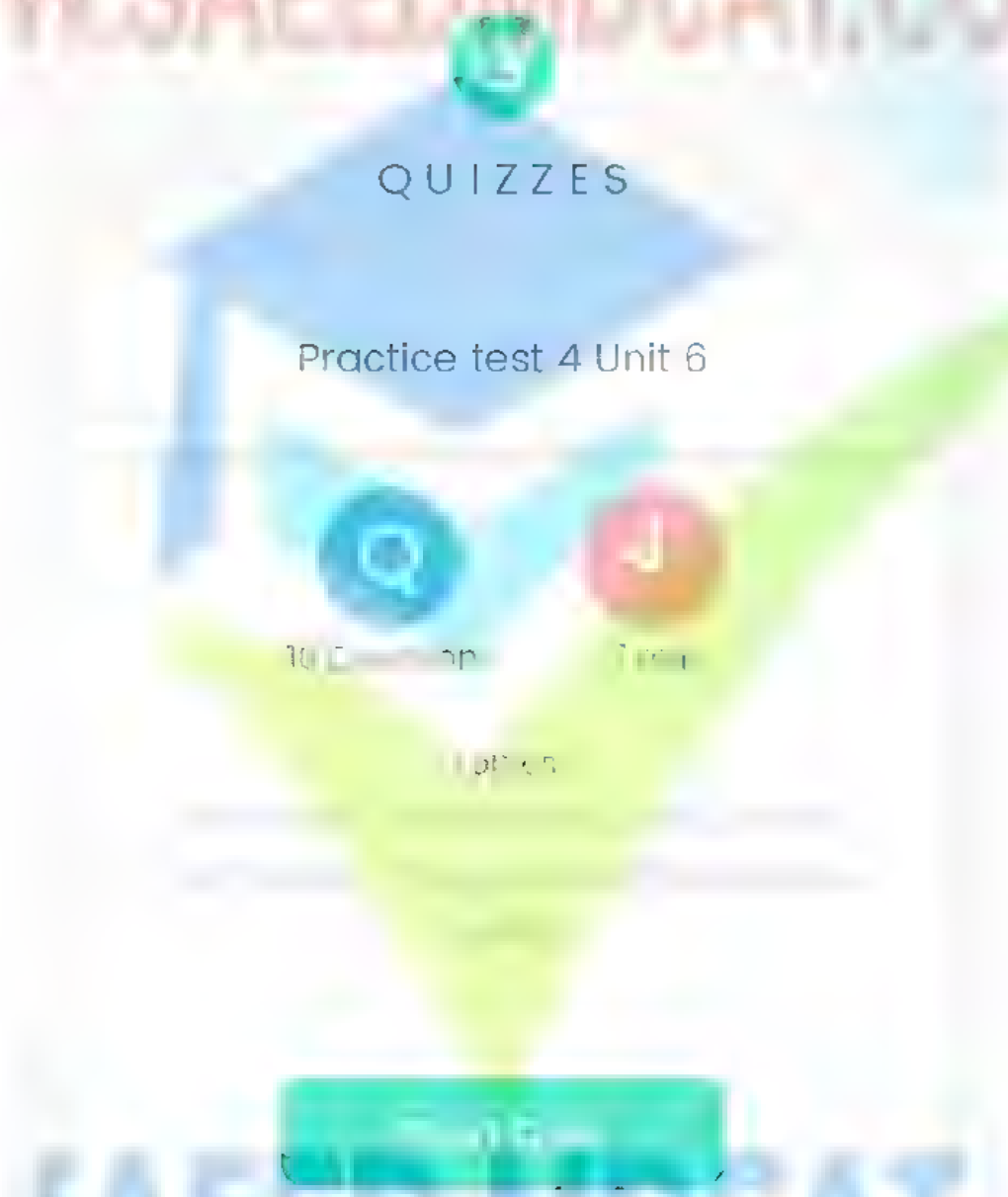
B. Lamp will burst out

C. Lamp will glow normally

D. None of these

Explanation

When a lamp is connected to D.C. line with a capacitor. If will form an open circuit. Hence, the lamp will not glow



Q : If RC is small, then capacitor will be charged and discharged

- slowly
- quickly
- with medium speed
- with constant speed

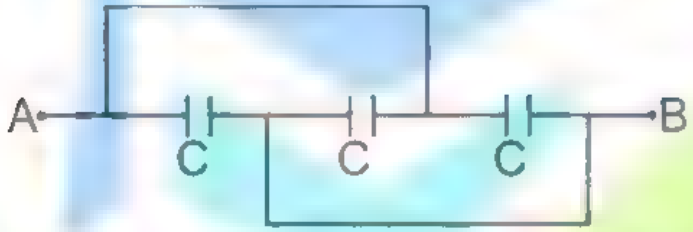
Q : Equivalent capacitance is greater than ndividual capacitances in

- series combination
- Parallel combination
- both a and b
- none of these

Q : Three capacitors of capacitance 12 μF each are available. The minimum and maximum capacitances which may be obtained from these are

- 12 μF, 36 μF
- 4 μF, 12 μF
- 4 μF, 36 μF
- 0 μF, ∞ μF

Q : Three equal capacitors, each with capacitance C are connected as shown in fig. the equivalent capacitance between A and B is·



C

C/3

3C

3/2C

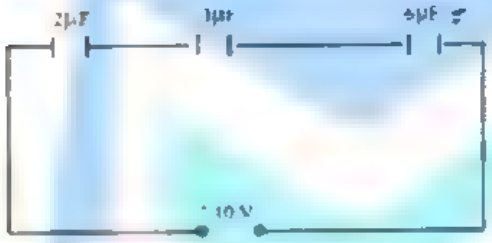
Q : Two capacitors of 1μF and 2μF are connected in series across a 100V supply. The energy stored in the system is

- 2/300
- 1/100
- 1/300
- 3/100

Q : Capacitor stores energy in the form of

- electric field
- magnetic field
- both of these
- gravitational field

Q : In the figure below , the charge on 3 μF capacitor is



5 μC

10 μC

3 μC

0 μC

Q : When potential in a capacitor rises from 0 to V, then average potential difference is

- V
- −V
- $\frac{V+V}{2}$
- $\frac{V}{2}$

Q : The product RC is called

- decay constant
- constant
- time constant
- resistance of capacitor

Q : A person uses five capacitors of same value such that he combines them in series and then in parallel combination. What is the ratio of maximum to minimum capacitance be obtained?

- nC
- $\frac{C}{n}$
- n^2C
- n^2

QUIZ RESULT

Practice test 4 Unit 6

0/10

0%

Incorrect

1/10

Q : If RC is small, then capacitor will be charged and discharged

A slowly

B quickly

C with medium speed

D with constant speed

Explanation

t = RC

If 'RC' product is small then t (charging time) is small

Incorrect 2/10

Q : Equivalent capacitance is greater than individual capacitances in

series combination

Parallel combination

both a and b

none of these

Explanation

$Ceq = C_1 + C_2 + C_3$

$Ceq > C_1, Ceq > C_2 Ceq > C_3$

Incorrect

3/10

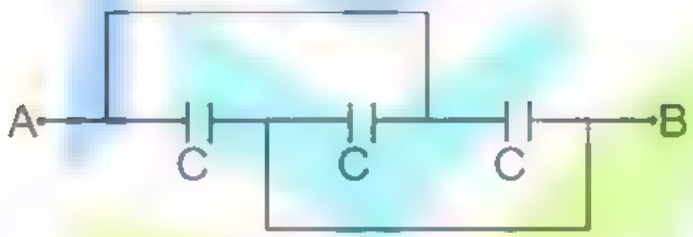
Q : Three capacitors of capacitance 12 μF each are available The minimum and maximum capacitances which may be obtained from these are

- 12 μF, 36 μF
- 4 μF, 12 μF
- 4 μF, 36 μF
- 0 μF, ∞ μF

Explanation

- $C_{max} = C_{parallel} = nc = 3(12) = 36\ \mu F$
- $C_{min} = C_{series} = \frac{c}{n} = \frac{12}{3} = 4\ \mu F$

Q : Three equal capacitors, each with capacitance C are connected as shown in fig. the equivalent capacitance between A and B is:



C

C/3

3C

3/2C

Explanation

The comb nation is equivalent to 3 capacitors in parallel. Therefore net capacitance between A and B = 3C

Q : Two capacitors of 1μF and 2μF are connected in series across a 100V supply. The energy stored in the system is

- 2/300
- 1/100
- 1/300
- 3/100

Explanation

$$E = \frac{1}{2}CV^2 = \frac{1}{2} \cdot \frac{1 \times 2}{1+2} \cdot 10^{-6} \times 100^2$$

$$= \frac{1}{2} \cdot \frac{2}{3} \cdot 10^{-6} \times 10000$$

$$= \frac{1}{3} \cdot 10^{-2} = \frac{1}{300}$$

Incorrect

6/10

Q : Capacitor stores energy in the form of

- electric field
- magnetic field
- both of these
- gravitational field

Explanation

Capacitor is a device which store energy with the help of stationary charges and stationary charges produce electric field.

Q : In the figure below , the charge on 3 μF capacitor is

A 5 μC

B 10 μC

C 3 μC

D 6 μC

Explanation

$Q = C_{eq} V$ ..... (i)

$$\frac{1}{C_{eq}} = \frac{1}{2} + \frac{1}{3} + \frac{1}{6}$$

$C_{eq} = 1\,\mu F$

$Q = (1\,\mu F)(10V)$

$Q = 10\,\mu C$

Correct Unattempted

Incorrect Q 8/10

Q : When potential in a capacitor rises from 0 to V, then average potential difference is

A V

B −V

C $\frac{V+V}{2}$

D $\frac{V}{2}$

Explanation

$$V_{av} = \frac{0+V}{2} = \frac{V}{2}$$

Correct | Unattempted

Incorrect | 9/10

Q : The product RC is called

A decay constant

B constant

C time constant

D resistance of capacitor

Explanation

$$RC = \left(\frac{V}{I}\right)\left(\frac{Q}{V}\right) = \frac{Q}{I} \quad \because V = IR \rightarrow R = \frac{V}{I}$$

$$\text{As, } I = \frac{Q}{t} \rightarrow t = \frac{Q}{I} \quad Q = CV \rightarrow C = \frac{Q}{V}$$

so,

$$\boxed{RC = \frac{Q}{I} = t}$$

Incorrect

10/10

Q : A person uses five capacitors of same value such that he combines them in series and then in parallel combination. What is the ratio of maximum to minimum capacitance be obtained?

A nC

B $\frac{C}{n}$

C n^2C

D n^2

Explanation

$C_{max} = C_{parallel} = \boxed{nC}$

$C_{min} = C_{series} = \frac{C}{n}$

so,

$$\frac{C_{max}}{C_{min}} = \frac{nC}{C/n} = n^2$$